Responses to Reviewer 2:

"CALIOP V4 Cloud Thermodynamic Phase Assignment and the Impact of Near-Nadir Viewing Angles" *by* Melody A. Avery et al.

Summary:
The authors would like to thank two reviewers for carefully reading our paper. We appreciate the supportive comments made by both reviewers and we are happy to make the suggested minor changes. In each case we have made the suggested change, which improves the clarity of our presentation, so we are grateful to the reviewers. For ease of tracking these changes we have itemized our action for each change suggested. Our comments are in blue, after each comment.

Reviewer 2:

Page 3

Line 33-34: It should be stated, at least briefly, how IIR observations complement the cloud phase determinations.

> This sentence was added after the first mention of the IIR on line 26:

" The IIR data along the lidar ground track provides additional information about cloud particle size using an improved split window technique (Garnier et al., 2012, 2013). "

Page 4
Line 19: "HOI" has already been defined on Line 29 on Page 3.

> On line 19 we deleted the "hereafter to be called horizontally-oriented ice" since it is redundant to line 20 on page 3.

Page 5

Lines 10-15: It would be helpful to the reader to discuss a range of expected differences between the molecular-only layer attenuated backscatter and the total layer attenuated backscatter, so that the assumption that $\delta_p(z) \cong \delta_v(z)$ is clear.

> Unfortunately, there is no simple way to characterize the range of the equivalent layer-integrated molecular backscatter, nor the difference between estimated particulate backscatter using the Hu equation (Eq. 5 in this paper) and the actual particulate backscatter. However, Hu et al. 2009 who developed the original threshold say this, "For optically thin clouds with extinction coefficients less than 0.2 km^{-1}, the molecular backscatter accounts for more than 10% of the 532-nm lidar return. The errors in the estimated particulate depolarization ratio can be as high as 0.1." Since this might be useful in thinking about the molecular contribution, this discussion has been added to the paper.

Page 6

Line 37: remove closing parenthesis after Mioche et al., 2010.

> Done.

Page 12

Line 22: Replace ", however this has been corrected in V4.5 and" with ". However, this has been corrected in V4.5, and"

> Done.

Line 23-24: Rewrite to "If the centroid temperature is > 0 °C the layer will be assigned as low-confidence water, and occurs only rarely in < 0.1% of layers detected at 5-80 km."

> This suggestion is much better, thank you - done.

Page 14 Line 15 (and throughout): Use consistent terminology. Either "viewing angle" or "view". Some readers may confuse "view" for "field of view" taken out of context.

> Thank you, we can see how this is confusing. After searching for the word "view" throughout the document, we have replaced "view" with "viewing angle" throughout the document where we mean viewing angle. In a few instances we really do mean to say "view" and not "viewing angle" or "field of view". These remain as "view".

Page 20

Is the color scale for the CALIOP 532 nm backscatter curtain the standard one used in quicklooks (as in Figure 12a)? It appears that either the color scale is shifted or small values are being masked out, so please include a color bar or note about the values presented. There is no appearance of "total attenuation" underneath the clouds in Figure 11 as there is in Figure 12.

> This is a good catch. When William Straka blended the CALIOP and VIIRS data together to produce the image he eliminated the attenuated areas. Here is the amended Figure11 caption:

" Overview of "Superstorm" Sandy, with VIIRS day/night image and CALIPSO Sandy overpass on the left-hand side, and then on the right-hand side is a view from the west, with the corresponding CALIOP backscatter browse image superimposed. The CALIOP backscatter color scale used is the same as that used for standard browse images except that attenuated areas under the storm cloud tops are shown as background. This image was provided by William Straka III, at the University of Wisconsin."

Page 25

Line 20: Fix the notation of "67deg N – 67deg S" to a symbolic representation of degrees (As in the caption for Figure 16).

> Done.